

Appl. No. 10/705,174  
Docket No. 8681RCR2  
Amdt. dated 26 November 2007  
Reply to Office Action mailed on 2 July 2007  
Customer No. 27752

## REMARKS

### Claim Status

Claims 1-6, 8-9 and 12-16 are pending in the application, all of which are rejected. Herein, Applicants amend Claims 1, 5, 12-13, and 15; cancel Claim 16; and add Claims 17-20; WHEREUPON Claims 1-6, 8-9, 12-15, and 17-20 remain to be examined. The application contains 1 independent claim and 16 total claims. No additional claims fees are believed to be due.

Claims 1 and 5 are amended to more particularly point out and distinctly claim the subject matter which Applicants regard as their invention by indicating preferred characteristics of the filter particles and, for Claim 1, by indicating that the filter is operable to remove microorganisms. Claims 1, and 12-13 are amended to correct grammar and punctuation. Claim 15 is amended to depend from Claim 1. Basis for the amendments may be found in the original claims and specification.

Claim 16 is cancelled without prejudice.

It is believed these changes do not involve any introduction of new matter. Consequently, entry of these changes is believed to be in order and is respectfully requested.

### Alleged Obviousness over Cannon in view of Derbyshire and Hill

Claims 1-3, 5-6, and 8-9 are rejected under 35 USC §103(a) as allegedly being unpatentable over USPN 6,881,348 ("Cannon") in view of USPN 6,057,262 ("Derbyshire") and USPN 1,782,850 ("Hill"). Applicants respectfully traverse the rejection as applied to the amended claims for the reasons set forth below.

The Office Action states that Cannon teaches a column, i.e. "a housing", having an inlet and an outlet and a filter material disposed in the column comprising a plurality of mesoporous activated carbon filter particles loaded with a cationic polymer. The Action concedes that Cannon does not teach mesoporous wood activated carbon filter particles for bacteria and virus removal. The Action also states that Derbyshire teaches

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mesoporous granular activated carbon (GAC) particles made from wood, etc., wherein the mesoporous carbon is used for adsorption of large molecules taking advantage of relatively high pore surface area for increased adsorption activity. The Office Action further states that Hill teaches that bacteria are removed from water by activated carbon. The Action asserts that it would have been obvious to the skilled person to substitute mesoporous wood activated carbon particles for mesoporous bituminous or lignite GAC particles because they are equivalent mesoporous carbon having relatively high pore surface area for adsorption as disclosed in Derbyshire. The Action further asserts that the mesoporous wood activated carbon particles of Derbyshire in a column has the inherent capabilities of the claimed F-BLR and F-VLR by its sheer mesoporosity.

Cannon's deficiency is not remedied by Derbyshire and Hill, either alone or in combination. Derbyshire discloses processes for activating carbon and processes for using the same. Derbyshire teaches that "[A]ctivated carbons may be utilized in various applications to treat waste water, to recover solvents from process streams, to purify air and gases, to reduce gasoline vapor emissions and in gold recovery (col. 1, lines 19-22)" and "... mesoporous carbons are used for the adsorption of large molecules such as color bodies (col. 1, lines 32-36, emphasis added)". Nowhere does Derbyshire teach or suggest, as recited in Applicants' claim, a filter comprising, among other things, a filter material formed at least in part from a plurality of mesoporous wood activated carbon filter particles and particles selected from the group consisting of mesoporous wood activated carbon filter particles coated entirely with a cationic polymer, mesoporous wood activated carbon filter particles partially coated with a cationic polymer, and mixtures thereof, where the sum of the sum of the mesopore and macropore volumes of the filter particles is between about 0.2 mL/g and 2 mL/g; wherein mesopore means an intra-particle pore having a diameter between 2 nm and 50 nm, and macropore means an intra-particle pore having a diameter greater than 50 nm, wherein the filter is operable to remove microorganisms.

Hill fails to remedy this deficiency as well. Hill discloses a method comprising stirring a suspension of activated carbon in water by "giv[ing] the body of liquid in the settling vessel a slow rotational movement, say, of the order of one or two turns per hour" (col. 2, lines 98-100). Although Hill states that carbon, while lacking bactericidal properties, is able to remove bacteria (col. 2, lines 56-58), Hill goes on to say that because

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of the difficulty in freeing water of added carbon, the use of carbon remains impracticable (col. 2, lines 60-73). Hill attempts to address this impracticability with the disclosed stirring technique. However, Hill is void of any mention, teaching, suggestion, or motivation to provide a filter material formed at least in part from a plurality of mesoporous wood activated carbon filter particles and particles selected from the group consisting of mesoporous wood activated carbon filter particles coated entirely with a cationic polymer, mesoporous wood activated carbon filter particles partially coated with a cationic polymer, and mixtures thereof, where the sum of the sum of the mesopore and macropore volumes of the filter particles is between about 0.2 mL/g and 2 mL/g; wherein mesopore means an intra-particle pore having a diameter between 2 nm and 50 nm, and macropore means an intra-particle pore having a diameter greater than 50 nm, wherein the filter is operable to remove microorganisms, as recited in Applicants' claims.

Applicants submit that they have surprisingly found that mesoporous activated carbon, as claimed, is useful in the removal of bacteria and viruses from water. Applicants demonstrate this, e.g. in the results shown in Figures 7a and 7b, where the performance of a filter according to the invention (mesoporous RGC) is compared to that of a conventional filter (microporous coconut). As can be seen in Fig. 7a, the inventive filter is effective in removing *E. coli* for about 240 L of cumulative water volume, whereas the conventional filter fails at less than 40 L. As can be seen in Fig. 7b, the inventive filter is effective in removing MS-2 for about 80 to 100 L of cumulative water volume, whereas the conventional filter fails at less than 20 L. As demonstrated, all activated carbons are not alike, and cannot simply be interchanged with a reasonable expectation of success.

For these reasons, Applicants submit that the obviousness rejections, as applied to the amended claims, is improper and should be withdrawn.

Alleged Obviousness over Cannon in view of Derbyshire and Hill (the "Base References") in further view Additional References

Claims 4 and 14 are rejected under 35 USC §103(a) as allegedly being unpatentable over the Base References in further view of USPN 6,630,016 ("Koslow").

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Claim 12 is rejected under 35 USC §103(a) as allegedly being unpatentable over the Base References in further view of US Pub. No. 2004/0040906A1 ("Jagtoyen"). Claim 15 is rejected under 35 USC §103(a) as allegedly being unpatentable over the Base References in further view of Koslow. Claim 13 is rejected under 35 USC §103(a) as allegedly being unpatentable over the Base References in further view of Jagtoyen. Applicants respectfully traverse the rejection as applied to the amended claims for the reasons set forth below.

Applicants renew their argument above as it relates to the Base References. Applicants submit that deficiencies of the Base References are not remedied by the teachings of any of the Additional References alone or in combination, and that Claims 4, and 12-15 are non-obvious, at least by virtue of their dependence on Claim 1, which claims a filter comprising, among other things, a filter material formed at least in part from a plurality of mesoporous wood activated carbon filter particles and particles selected from the group consisting of mesoporous wood activated carbon filter particles coated entirely with a cationic polymer, mesoporous wood activated carbon filter particles partially coated with a cationic polymer, and mixtures thereof, where the sum of the sum of the mesopore and macropore volumes of the filter particles is between about 0.2 mL/g and 2 mL/g; wherein mesopore means an intra-particle pore having a diameter between 2 nm and 50 nm, and macropore means an intra-particle pore having a diameter greater than 50 nm, wherein the filter is operable to remove microorganisms.

For these reasons, Applicants submit that the obviousness rejections, as applied to the claims, is improper and should be withdrawn.

### Conclusion

This response represents an earnest effort to place the present application in proper form and to distinguish the invention as claimed from the applied reference(s). In view of the foregoing, entry of the amendments presented herein, reconsideration of this application, and allowance of the pending claim(s) are respectfully requested.


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If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is kindly invited to telephone the undersigned attorney.

Respectfully submitted,

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By

  
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